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CROP PRODUCTION NEWS

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CROP PRODUCTION

PRODUCTION

Editor's Comments

By Faye Dokken-Bouchard, PAg, Crops Branch

This time of year, it is easy to get caught up in preparations for harvest, a busy work schedule or even holiday plans. Nonetheless, whether you are a farmer, researcher or agronomist, it is important to continue monitoring fields whenever possible and to record the latest crop conditions, weather and pest observations from the 2010 season.

For farmers, a good set of notes for each field can help when planning crop rotations, determining the effectiveness of pest control programs and making management decisions for future years. Researchers may find that information about the season can sometimes help explain unexpected results in field experiments. It is important not to forget what happened in the field, especially when the data is being analyzed long after the numbers have been collected. Experienced agronomists often know what to expect in a given year by comparing conditions with what they have experienced in the past. Making notes on the problems that came up this year and how they were solved will help us be ready to predict issues before they arise next time.

Some diseases may become more obvious as the crop matures – this is one of the reasons we do our canola disease survey just before swathing. See page 6 in this issue of Crop Production News for a summary of our plant disease surveys planned for 2010.

In this issue you will also find articles on when to stop spraying fungicides, a lentil disease update, recommendations for the upcoming pulse crop harvest, bertha armyworms, and some new information for camelina growers.

NOTE: Throughout this document, you will see that some publications are in blue font and underlined, indicating links to website information. If you are reading this on your computer screen, click your cursor on the link to take you directly to the website. ✪

Crop Production News is a bi-weekly publication prepared primarily by provincial specialists with the Crops Branch and Regional Services Branch of the Saskatchewan Ministry of Agriculture. It is a compilation of articles related to entomology, plant pathology, weed science, soils and agronomy issues.

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Crop Protection Laboratory Update

By Philip Northover, AAg, Supervisor, Crop Protection Laboratory

Submissions received since the last update have related mainly to concerns about weeds and chemical and environmental damage. Root and stem rots have comprised the majority of disease submissions to date. Cereal and lentil samples with flowering and seed production issues have also been received in the last two weeks. As Dutch elm disease samples arrive in larger numbers, the percentage of positives has been on the increase.

The following diseases (caused by pathogens) have been diagnosed in the past two weeks:

- Barley: scald
- Wheat: bacterial streak, cephalosporium stripe
- Lentil: stemphylium blight, ascochyta blight, anthracnose
- Canola: blackleg
- Pea: mycosphaerella blight, ascochyta foot rot, fusarium foot rot
- Potato: late blight
- Tomato: late blight
- Turfgrass: bipolaris leaf spot, melting out
- Apple: apple scab

The following weeds have been identified from samples in the past two weeks: glaucous blue grass (*Poa glaucifolia),* fowl bluegrass *(Poa palustris),* corn gromwell (*Lithospermum arvense*), Junegrass (*Koeleria gracilis*), sago pondweed (*Potamageton pectinatus*), tufted vetch (*Vicia cracca*), silver sagebrush (*Artemisia cana*), western water hemlock (*Cicuta douglasii*) and cow parsnip (*Heracleum lanatum*).

The following insects have been identified from samples in the past two weeks: alfalfa curculio (*Sitona lineelis*), scarab larvae, elm sawfly (*Cimbex americana*), diamond back moth (*Plutella xylostella*) and an ichneumonid wasp.

Of 70 Dutch elm disease submissions received this year, 37 have been confirmed with Dutch elm disease and two with dothiorella wilt. The remaining 41 were negative. ✿

Agriculture Knowledge Centre Update

By Patrick Mooleki, PAg, Soil/Nutrient Management Specialist

The Agriculture Knowledge Centre (AKC) continues to receive a large number of calls regarding crop diseases and insect pests. Questions on timing and economic thresholds for applying fungicides on canola, cereals and pulses have continued. There have been many calls on stemphylium blight in lentil and producers are wondering what they should do and what the impact on yield and quality would be if they did nothing. The second prominent question has been on differentiating between grey mould and white mould in lentil, and what should be done at this time of the year with crops nearing the end of flowering. Answers to these questions can be found in the articles 'When to Stop Applying Fungicides' and 'Stemphylium Blight of Lentil'.

On cereals, calls have been on leaf disease identification. Most symptoms were described as blotches or spots. These were referred to the Crop Protection Lab for further diagnosis and identification.

There have been many calls about the economic threshold and control of aphids in lentil, pea, flax and canola. Other calls have been about the economic threshold of grasshoppers and diamondback moths. Questions on the economic threshold, timing and control of wheat midge dominated the earlier part of this reporting period.

Hail, strong winds and heavy rains have caused crop damage, and producers are wondering about crop recovery, impact on yield and quality, and what to do with crops lying on the ground rotting but too immature to swath or desiccate.

There have been calls on herbicide options to control advanced weeds, mainly Canada thistle, on un-seeded land that is finally drying out. Producers are wondering whether they should wait until fall to spray; or to control now using a higher rate of glyphosate. In addition, producers are wondering what to use to control volunteer Roundup Ready canola in un-seeded fields. Some have sprayed their fields already, but there is poor control so they are wondering what to do next.

Rain, standing water and high humidity are slowing down the cutting and baling of hay stands. This is more prevalent in the northeast. Producers are looking for some opening in the forecast which would allow them time to cut and bale the hay before it rains again. ☼

When to Stop Applying Fungicides

By Faye Dokken-Bouchard, PAg, Provincial Specialist, Plant Diseases

With weather conditions across the province conducive to disease this season, many crops received at least one fungicide application in June or July. Even with late-season diseases leading producers to consider multiple applications, at some point we have to say we are done. But how do we know when enough is enough? Keeping the disease triangle in mind, we must consider the following factors to determine when to stop applying fungicides.

Crop Considerations

- Variety: What is the disease resistance rating and what are realistic expectations for the type of crop or specific variety under current conditions? For example, chickpea varieties with 'very poor' resistance are likely to have some pod lesions, even with an intensive fungicide program during the season. Blackleg may appear even on resistant canola varieties if they have been damaged (hail).
- Staging for cereals: Spray at flag-leaf emergence for leaf spots, as the last two leaves determine the yield. For fusarium head blight (FHB), spray no later than when the main head is 75 to 100 per cent emerged until 50 per cent flowering, as this is when the plant is most susceptible to the disease. By the time you see FHB symptoms, it is too late to spray.
- Staging for pulses: Generally, the recommendation is to spray during flowering to protect the crop yield; applying fungicides later in the season to protect new growth may delay crop maturity. Later fungicide applications can protect the developing seeds from infection (seed growers may benefit); however, once the crop starts to visibly ripen it will likely not make a difference. Most pulse crop pathogens need moisture and green, living tissues to infect and spread.
- Staging for canola: Spray at 20 to 50 per cent bloom, as fungicide needs to protect the petals in order to protect against sclerotinia. By the time you see symptoms of sclerotinia, it is too late to spray.

Disease Severity and Other Factors Affecting Condition of Crop

- Is disease present? Fungicides cannot cure disease. If effective control has not been achieved during the season and symptoms are already widespread, it is usually too late to apply a fungicide.
- Has the crop been damaged by other factors? Are there other reasons it may not be worth saving? Do you expect the crop to recover? Crops often recover from early damage such as hail; however, if significant injury occurs during podding/seed development, it is likely not worth saving.
- Will flowers developing now have time to mature before fall frosts? For example, pulse crops require about one month to form mature seeds from flowers. Protecting late season growth in August is rarely economical in regions where fall frosts are common the first two weeks of September. **(Continued on page 5)**

When to Stop Applying Fungicides

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Weather Conditions

- Warm dry weather will naturally control diseases as well as progress the crops to maturity.
- Cool wet weather will favour disease and potentially delay maturity.

Estimated Yield and Crop Value

- What disease impact are you expecting and to what degree do you anticipate fungicide will improve the crop yield/quality at harvest?
- Will you make enough money after harvest to pay for the application(s)?

		Expected Gross Return ($/acre) =		
Estimated Yield (unit/acre)	X	Estimated Yield Savings (%)	X	Selling Price ($/unit)
		Expected Net Return ($/acre) =		
Expected Gross Return ($/acre)		minus		Fungicide application costs

Other Fungicide Application(s) Considerations

- How many times has the crop already been sprayed? Do you expect this to be the last spray? Have you already reached the maximum number of applications allowed by the fungicide label?
- Have you used a proper fungicide rotation to prevent fungicide resistance?
- Are you too close to harvest? Follow the recommended pre-harvest interval of the fungicide (check the *Guide to Crop Protection* or product label). Some examples:
  - Bravo (chlorothalonil): lentil/chickpea 14 days, peas 32 days, wheat 30 days
  - Caramba (metconazole): cereals 30 days
  - Folicur (tebuconazole): wheat 36 days
  - Headline (pyraclostrobin): pulses 30 days, flax 21days, cereals no later than end of flowering
  - Lance (boscalid): pulses and canola 21 days
  - Mancozeb Products (Dithane/Manzate/Penncozeb): lentil 35 days, wheat 40 days
  - Proline (prothioconazole): barley and wheat 30 days, canola 36 days, chickpea and lentil 7 days
  - Propiconazole Products (Tilt/Bumper/Pivot): cereals 45 days, canola 60 days
  - Quadris (azoxystrobin): canola 30 days, coriander 21 days, pulses 15 days
  - Quilt (azoxystrobin + propiconazole): pulses 30 days, cereals 45 days
  - Rovral Flo/RX (iprodione): canola 38 days
  - Serenade (biofungicide): can be applied up to harvest
  - Stratego (propiconazole + trifloxystrobin): cereals 45 days

Answering the question of "When should I stop applying fungicide?" becomes less complicated if you keep the disease triangle in mind: the stage of the host crop; the potential of the pathogen to cause further damage; and, the environmental conditions expected for the remainder of the season. ✿

2010 Plant Disease Surveys

By Sean Miller, PAg, Integrated Pest Management Agrologist

Saskatchewan Agriculture's disease surveys are an important component of integrated disease management plans. The disease surveys give producers notice of potential disease problems in their region and provide an incentive to take the necessary monitoring, preventative and control measures in the following year.

Figure 1: Canola Disease Survey.
Source: Agriculture and Agri-Food Canada

Cereal Disease Surveys

The **Fusarium Head Blight Survey** monitors the severity and spread of fusarium head blight, as well as the *Fusarium* species responsible for infection. The information collected from the survey can also be used to provide disease control recommendations for producers. Surveyors collect cereal heads when crops are in the early milk to early dough stages. The samples are sent to the Crop Protection Laboratory for species identification and disease severity ratings.

The **Cereal Leaf Disease Survey** determines the prevalence and distribution of cereal leaf diseases, and is conducted at the same time as the Fusarium Head Blight Survey. The survey also identifies the most prominent pathogens in each region. Surveyors collect samples of flag leaves from fields within their region. The samples are sent to specific laboratories for pathogen identification and severity ratings.

Figure 2: Pea Disease Survey.
Source: Saskatchewan Agriculture

Pea Disease Survey

The Pea Disease Survey is conducted from late July to early August. Disease assessments are made in-crop by observing several representative plants to determine the general health and presence or absence of disease symptoms. Prevalence of the following diseases is recorded: root rot, ascochyta leaf and pod spot, powdery mildew, sclerotinia stem rot, septoria leaf blotch and bacterial blight. Prevalence and severity of mycosphaerella blight / ascochyta foot rot and downy mildew are also estimated.

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2010 Plant Disease Surveys
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Canola Disease Survey
The Canola Disease Survey is conducted from mid- to late-August by volunteer pathologists, agronomists and Saskatchewan Agriculture staff. Canola is assessed visually for diseases such as sclerotinia stem rot, blackleg, alternaria black spot, fusarium wilt, and aster yellows. Disease incidence is recorded in the field. With the producers' permission, soil samples will also be collected for clubroot DNA testing from 75 fields.

Results of the 2010 disease surveys will be available to growers, and will be posted in the winter on the Canadian Plant Disease Survey website at: www.cps-scp.ca/cpds.shtml. Past surveys are also available at the survey website or by contacting sean.miller@gov.sk.ca ☼

Stemphylium Blight of Lentil

By Faye Dokken-Bouchard, PAg, Provincial Specialist, Plant Diseases

Reports of stemphylium blight on lentil have started coming in over the last couple of weeks. It is generally believed that stemphylium blight is on the rise in Saskatchewan, and this has warranted further research to determine the extent of the potential problem and what can be done about it. The following is a summary of what we know so far.

Figure 3: Stemphylium blight on lentil near Yellow Grass, 2009.
Source: Saskatchewan Agriculture

Disease Diagnosis
On lentil, stemphylium blight initially appears as small, light beige lesions on the leaves/leaflets. While the disease is most readily apparent when blighted leaves appear at the top of the canopy, it will also be present under the canopy, as the fungus is often present in the crop from the early seedling stage. Lesions tend to spread across the leaflets from one side to the other, killing entire leaflets and branches. Prolonged moist periods promote further infections and give the upper canopy a grey-brown appearance.

As is common in other lentil diseases, infected leaflets fall to the ground, serving as a source of spores for future infections of a wide range of plants. When examined through a hand lens or microscope, older lesions will appear dark brown and fuzzy (due to fungal spore production), and leaves will be twisted and rolled, as they have been desiccated by the pathogen (Figure 3).

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Stemphylium Blight of Lentil
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Stemphylium spp. are common saprophytes, but, under the right conditions and in the presence of a susceptible host, these species will take advantage of the opportunity to behave as a pathogen on a wide range of crops. Sometimes *Stemphylium* spp. will exploit a predisposing factor, such as frost, heat or chemical damage, or even another pathogen that caused damage initially. However, in other countries like Bangladesh and Nepal, where stemphylium blight is a major problem on lentil, heat and humidity in late summer when there is a lot of vegetative growth are considered the major factors for disease. Stem*phylium botryosum* is generally considered to be the culprit in lentil infections; however, little is known about the host specialization.

Disease Impact and Management
In 2007, stemphylium blight was relatively severe and widespread after a dry-but-relatively-humid growing season. However, in 2008, the disease was observed in less than a quarter of the lentil crops surveyed in Saskatchewan, with trace average incidence overall (see the Canadian Plant Disease Survey at www.cps-scp.ca/cpds.shtml). Isolated incidences of the disease were identified through Crop Protection Laboratory submissions and other inquires in 2008.

In 2009, the lab identified stemphylium blight on several lentil submissions, while Ministry agrologists and the Agriculture Knowledge Centre received numerous calls regarding the disease. *Stemphylium* sightings have already been reported this year as well.

Figure 4: Diseased lentil near Davidson, 2009.
Source: Saskatchewan Agriculture

As growers become more aware of stemphylium blight, it is more likely to be recognized, but we still don't know if the disease is causing significant yield losses, or simply occurring at a time when leaf-drop encourages the crop to dry down and expedite harvest. While the fungus may be damaging the plant, it can be difficult to provide definitive answers to the common questions, "why did this happen and what should I do?"

As with other plant diseases, temperature and moisture are critical factors in stemphylium blight infection and development. Preliminary research at the University of Saskatchewan has shed some light on the epidemiology of the disease in this climate. The pathogen, *S. botryosum* prefers high temperatures (above 25°C), and a minimum of eight hours of leaf wetness for optimal disease development on lentil; however, it can remain infectious even if the wet conditions are interrupted by six- to 24-hour dry periods. High relative humidity (~85 per cent) is also favourable for development of this disease.

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Stemphylium Blight of Lentil
(Continued from page 8)

Infection may lead to seed staining, reduced seed size and low germination rates, and the pathogen is routinely isolated in seed testing laboratories. However, the significance of seed transmission of stemphylium blight in Saskatchewan is unknown. At this time, there are no fungicides registered for control of stemphylium blight on lentil. While the value of crop rotation should never be downplayed, its effect is limited because *Stemphylium* spp. can survive in the absence of a host. Generally, when crop residue has been buried or broken down, inoculum levels will be reduced.

Other Lentil Disease Issues

Botrytis grey mould and **sclerotinia** have also been noticed in addition to stemphylium blight. Clouds of *Botrytis* spores become visible when the crop is disturbed, and appear as a velvety growth covering rotting stems and pods (Figure 5). Sclerotinia stem and pod rot will be identified by the white mould and black sclerotia may develop on the outside of the stem (Figure 6). While there are registered fungicides for the control of botrytis grey mould and sclerotinia on lentil, late-season control of diseases that appear post-flowering are likely to have minimal impact on yield. When planning next year's rotation, remember that sclerotinia affects other broadleaf crops, including canola. ✿

Figure 5: Botrytis grey mould on lentil
Source: Saskatchewan Agriculture

Figure 6: Sclerotinia stem rot on lentil
Source: Saskatchewan Agriculture

Preparing for the Pulse Crop Harvest

By Dale Risula, PAg, Provincial Specialist, Special Crops

This year's harvest of pea and lentil has already begun south of the border. Montana and North Dakota reported on July 30 that approximately one per cent of the crop had been harvested. Traditionally, pulse crops are the first to be sown in Saskatchewan and thus are also the first to be harvested. Weather is a major factor controlling timing of harvest, but farmers can start preparing now. Although there were rain delays in 2010, much of the pulse crop was seeded prior to the rains. Common pulse-growing areas are mid-western and southwestern Saskatchewan, where seeding began earlier than other areas.

Crop maturity is not something that can be rushed by human intervention. Once the crop is planted and growing, it is up to nature to dictate how quickly it matures. Plant variety, moisture, temperature, day length, insects and diseases all contribute to the time required. However, the maturity process can be facilitated by swathing and desiccation.

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Preparing for the Pulse Crop Harvest
(Continued from page 9)

Timing for swathing and desiccation are similar for all pulse crops: when the crop has reached approximately 30 per cent moisture content. Seeds found on lower branches of the plant will be more mature than those found at the top. This is largely due to the indeterminate nature of pulse crops. In order to maximize yield and quality, Saskatchewan Agriculture recommends particular plant characteristics be evident before beginning swathing or desiccation.

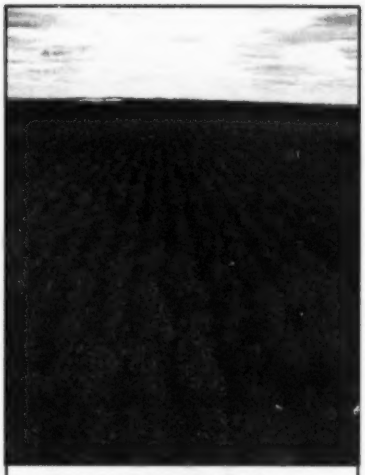


Figure 7: Desiccated lentil crop, ready to be combined.
Source: Saskatchewan Agriculture

For lentil, swath when the lower 30 per cent of pods are tan in colour and their seeds rattle when shaken. Middle pods may still be green and the upper part of plant may still be flowering. Desiccate when the lower-most pods are tan in colour and rattle when shaken.

For yellow pea, swathing should begin when the bottom 30 per cent of pods are ripe, the middle 40 per cent of pods and vines are yellow, and the upper 30 per cent of pods are turning yellow. Desiccate yellow pea when the bottom pods are ripe and dry, and seeds are detached from the pods. For other pulse crops, see the Saskatchewan Agriculture publication *When to Harvest Special Crops*.

Pulse crops are also prone to quality loss if subjected to particular environmental conditions for too long. For example: green pea bleaches readily if subjected to a mix of rain and bright sunshine, so picking them up with the combine quickly is desirable.

Lentil should be harvested and conditioned quickly before being placed into long-term storage. Green lentil is downgraded due to colour deterioration that occurs when stored in hot conditions and when seed moisture content is too high. Lentil seed should be dried and cooled in aeration bins shortly after combining to prevent this from happening.

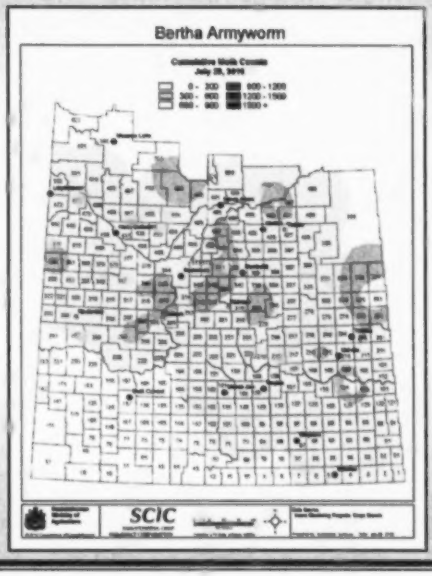
Also, preparing machinery ahead of time is an important part in the process of harvesting pulse crops and will help alleviate problems once harvest begins. Pulses are short-stature plants requiring specialized equipment that can operate close to the ground. Stones, soil, and other debris can quickly disrupt the efficiency of a combine. Ensuring all equipment is operating properly will help facilitate this year's pulse crop harvest.

For more information, see the following publications:
Lentils in Saskatchewan - June 2010
When to Harvest Special Crops
Pulse Crops - FAQ
Red Lentil

Bertha Armyworm Map

→ The latest *Bertha Armyworm Map* can be found on the Saskatchewan Agriculture Website at: www.agriculture.gov.sk.ca/maps_section (then scroll down to *Bertha Armyworm Map*).

→ Bertha Moth Trap Co-operators please note that the last week of data collection is the week ending August 6th.



REMEMBER TO FOLLOW PREHARVEST INTERVAL GUIDELINES WHEN APPLYING PESTICIDES:

Preharvest intervals (PHI) must be followed to prevent pesticide residues from being detected in the seed. The PHI is the number of days that must pass between the last application of a pesticide and harvest. Harvest is defined as the cutting of the crop or the removal of the product from the plant. The PHI includes direct combining, cutting (swathing) or grazing; it does not include swath-combining or baling for hay.

Refer to the pesticide label or the 2010 Guide to Crop Protection for more information on specific PHI's.

Assure II now Registered for Camelina:

By Venkata Vakulabharanam, PAg, Provincial Specialist, Oilseed Crops

Interest in camelina has grown in the last couple of years due to new markets for its oil and meal. Producers are realizing the advantages of camelina, and researchers are working hard to develop more information on how to grow the crop successfully in Saskatchewan.

Figure 8: Camelina
Source: Saskatchewan Agriculture.

The benefits of camelina include drought tolerance, early maturity, and non-shattering pods that allow direct harvesting. Camelina is also resistant to canola pests like blackleg, alternaria pod spot and flea beetles. Camelina seeds can germinate at temperatures as low as 1°C and young plants show resistance to frost up to -10°C. This cold tolerance facilitates fall and early spring seeding. One disadvantage of camelina was that no herbicides were registered until this growing season. This is slowly changing.

Assure II herbicide (quizalofop-P ethyl) registration was pursued under the User Requested Minor Use Label Expansion (URMULE) Program. The Pest Management Regulatory Agency (PMRA) completed the evaluation in June 2010, and recently granted registration of the herbicide for camelina. Currently, Assure II (at variable rates) is registered to control several grassy weeds in the registered crops. The product label is currently being developed to provide directions for proper use. **Assure II may not be used until the label is approved by PMRA.**

Eric Johnson at the Agriculture and Agri-Food Canada's research station in Scott evaluated several other broadleaf herbicides on camelina, including: Assert 300SC, Attain, 2,4-D Amine, MCPA Amine, Basagran Forte, bromoxynil*, 2,4-DB*, Frontline, Lontrel, Liberty, Authority, isoxaflutole, Odyssey and thifensulfuron/tribenuron*. However, none of the tested broadleaf herbicides provided adequate tolerance on camelina and **most caused death of the camelina plants.**

*see *Guide to Crop Protection* for product names at
http://www.agriculture.gov.sk.ca/Guide_to_Crop_Protection

In future, pre-harvest application of glyphosate (Roundup) will be tested under the URMULE Program.

The ***Crop Production News*** is a publication of the
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